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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/716,624

11/20/2003

Yung-Shu Yang

6352

7590

09/08/2004

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EXAMINER

DICKEY, THOMAS L

ART UNIT

PAPER NUMBER

2826

DATE MAILED: 09/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/716,624

Applicant(s)

YANG, YUNG-SHU

Examiner

Thomas L Dickey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Oath/Declaration

1. The oath/declaration filed on 11/20/2003 is acceptable.

Drawings

2. The formal drawings filed on 11/20/2003 are acceptable.

Priority

3. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Taiwan, R.O.C. on 08/26/2003. It is noted, however, that applicant has not filed a certified copy of the R.O.C. application as required by 35 U.S.C. 119(b).

Claim Objections

4. Claims 1-3 are objected to because of the following informalities:

A. The use of the preamble language "A light-emitting diode encapsulation material and manufacturing process comprising," makes it impossible to tell whether applicant's invention is a product, or a process.

Because applicant does not differentiate his product from the prior art, but makes it clear that his process differs from the prior art in that his process includes a step of curing by exposure to visible or UV light, or by irradiation by electrons, in contrast to the

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prior art process that includes only a step of curing by heating, applicant's claims have been examined under the assumption that applicant claims a process, using approximately the following language:

1. A light-emitting diode (LED) encapsulation material manufacturing process comprising the steps of: encapsulating a LED chip in a photo-sensitive polymer constituting at least one of an Oligomer or a reactive Monomer, said photo-sensitive polymer further comprising a Photoinitiator; and exposing the photo-sensitive polymer to visible light irradiation, free of infrared rays, in order to trigger a free radical polymerization reaction of the photo-sensitive polymer, and rapid curing thereof under room temperature, eliminating the need for heating in a furnace during encapsulation manufacturing process of the light-emitting diode, while prompting rapid curing thereof, and thereby enhancing production efficiency.
2. A light-emitting diode (LED) encapsulation material manufacturing process comprising the steps of: encapsulating a LED chip in a photo-sensitive polymer constituting at least one of an Oligomer or a reactive Monomer, said photo-sensitive polymer further comprising a Photoinitiator; and irradiating with an electron beam to accomplish amalgamation of material molecules in order to trigger a free radical polymerization reaction of the photo-sensitive polymer, and rapid curing thereof under room temperature, eliminating the need for heating in a furnace during encapsulation manufacturing process of the light-emitting diode, while prompting rapid curing thereof, and thereby enhancing production efficiency.
3. A light-emitting diode (LED) encapsulation material manufacturing process comprising the steps of: encapsulating a LED chip in a photo-sensitive polymer constituting at least one of an Oligomer or a reactive Monomer, said photo-sensitive polymer further comprising a Photoinitiator; and exposing the photo-sensitive polymer to ultraviolet light in order to trigger a free radical polymerization reaction of the photo-sensitive polymer, and rapid curing thereof under room temperature, eliminating the need for heating in a furnace during encapsulation manufacturing process of the light-emitting diode, while prompting rapid curing thereof, and thereby enhancing production efficiency.

B. In independent claim 2, line 2, "the photo-sensitive polymer" has no apparent antecedent basis without reference to claim 1. Because claim 2 is independent, reference to claim 1 for an antecedent basis is technically forbidden.

Appropriate correction is required.

Information Disclosure Statement

5. If applicant is aware of any relevant prior art, he/she requested to cite it on form PTO-1449 in accordance with the guidelines set forth in M.P.E.P. 609.

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Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 3 is rejected under 35 U.S.C. 102(b) as being anticipated by OOTA (6,018,167).

Oota discloses a light-emitting diode (LED) encapsulation material manufacturing process comprising the steps of encapsulating a LED chip 41 in a photo-sensitive polymer 62 constituting at least one of an Oligomer or a reactive Monomer, said photo-sensitive polymer 62 further comprising a Photoinitiator; and exposing the photo-sensitive polymer 62 to ultraviolet light, in order to trigger a free radical polymerization reaction of the photo-sensitive polymer 62, and rapid curing thereof under room temperature, eliminating the need for heating in a furnace during encapsulation manufacturing process of the light-emitting diode, while prompting rapid curing thereof, and thereby enhancing production efficiency. Note figures 6A,6B and column 14 lines 16-36 of Oota.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

A. Claims 1,2, 7-9, 13-15, and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over OOTA (6,018,167) in view of WU ET AL. (6,114,090).

Oota discloses a light-emitting diode (LED) encapsulation material manufacturing process with all the limitations of claims 1,2, 7-9, 13-15, and 19-21 except substituting the step of exposing the photo-sensitive polymer to visible light irradiation, free of infrared rays, or of irradiating with an electron beam to accomplish amalgamation of material molecules for the step of exposing the photo-sensitive polymer to ultraviolet light, and except for the encapsulation material further including 0.01 %-15 % of ultraviolet absorber agent and 0.01 %-20% of Hindered Amine Light Stabilizer. Note figures 6A,6B and column 14 lines 16-36 of Oota.

However, Wu et al. discloses an encapsulation material manufacturing process where the steps of exposing a photo-sensitive polymer to visible light irradiation, free of infrared rays, irradiating with an electron beam to accomplish amalgamation of material molecules, and exposing a photo-sensitive polymer to ultraviolet light are interchangeable, and where the encapsulation material further includes 5% of ultraviolet absorber agent Tinuvin 238 and 5% of Hindered Amine Light Stabilizer Tinuvin¹ 770. Note column 6 lines 24-48 and column 16 lines 16-21 of Wu et al. Therefore, it would have been

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obvious to a person having skill in the art to replace the step of exposing the photo-sensitive polymer to ultraviolet light of Oota's light-emitting diode encapsulation with, alternately, the steps of exposing the photo-sensitive polymer to visible light irradiation, free of infrared rays, or of irradiating with an electron beam to accomplish amalgamation of material molecules such as taught by Wu et al.², and to further augment Oota's light-emitting diode encapsulation with the 0.01%-15% of ultraviolet absorber agent and 0.01%-20% of Hindered Amine Light Stabilizer such as taught by Wu et al. in order to prevent aging from UV exposure to thus provide a longer lifetime for the encapsulation material.

B. Claims 4-6, 10-12, 16-18, and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oota in view of Wu et al. as applied to claims 1-3, 7-9, 13-15, and 19-21 above, and further in view of HONDA ET AL. (4,317,862).

Oota and Wu et al. teach all the limitations of claims 4-6, 10-12, 16-18, and 22-24 except that the encapsulation material further includes 0.1%-20% of a Silane coupling agent. Note figures 6A,6B and column 14 lines 16-36 of Oota. Note column 6 lines 24-48 and column 16 lines 16-21 of Wu et al.

¹ Note that Tinuvin is a registered trademark of SpecialChem S. A., a specialty chemical company located in Paris France. SpecialChem makes a wide variety of both UV absorber agents and HALS and recommends the use of both additives to prevent plastics from aging under exposure to sunlight and other ultraviolet sources.

² In Wu et al.'s words, "Sources of actinic light [i.e. visible or UV light, or electron beams, inter alia], and exposure procedures, times, wavelengths and intensities may vary widely depending on the desired degree of polymerization, the index of refraction of the photopolymer and other factors known to those of ordinary skill in the art. Such conventional photopolymerization processes and their operational parameters are well known in the art. See for example in S. P. Pappas Ed. "Radiation Curing: Science and Technology" Plenum Press, New York, N.Y.; D. R. Randell Ed., "Radiation Curing of Polymers, II, Royal Society of Chemistry, Cambridge,

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However, Honda et al. discloses a photopolymerizable encapsulation material that includes 10% of a "commonly known" (Honda et al.'s words) Silane coupling agent. Note column 3 lines 62-68 of Honda et al. Therefore, it would have been obvious to a person having skill in the art to augment Oota's light-emitting diode encapsulation with the Silane coupling agent such as taught by Honda et al. in order to improve the adhesion of the encapsulation material to thus provide better adhesion between the encapsulation material and the LED.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L Dickey whose telephone number is 571-272-1913. The examiner can normally be reached on Monday-Thursday 8-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more informa-

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tion about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TLD
09/04


Minhloan Tran
Primary Examiner
Art Unit 2826